Cloud Billing Units and Accounting

Usage on the HECC AWS Cloud is charged in Cloud Billing Unit (CBU) where 1 CBU = 1 US dollar. A project is given an allocation of N CBUs when the principal investigator (PI) provides his/her NASA Work Breakdown Structure (WBS) number with N US dollars.

Charges include the following categories:

- ### AWS Dynamic Front End Usage

  A charge to the user for using the AWS dynamic front end is recorded on a per-front-end-request basis. After the front end session is terminated, an email with the charging record is sent to the user (see AWS dynamic front end for an example email). This charge is reflected in the `acct_query` output under the frontend queue.

- ### PBS Jobs Usage

  A charge to the user for running a PBS job is recorded on a per-job basis. After the job is terminated, the charging record is included in the PBS output file, which is sent to the $PBS_O_WORKDIR. For jobs submitted from a PFE, the $PBS_O_WORKDIR is under the user's Pleiades /nobackup directory. For jobs submitted from an AWS dynamic front end, the $PBS_O_WORKDIR is a directory on an AWS filesystem (a sample output can be found at the end of this article). This charge is reflected in the `acct_query` output under the cloud_exec queue.

- ### nas_s3_{get,ls} and Per-User S3 Long Term Storage Usage

  Charges associated with per-user and/or per-job S3 usage such as running the `nas_s3_{get,ls}` commands from NAS (which incur both file-transfer-out of AWS and network costs) and storing data in S3 are recorded daily with no individual notification in the form of an email or per-job output. They are reflected in the `acct_query` output under the daily resource charge (drc) queue.

- ### PBS Server at AWS, Job-Time Filesystem of -volume_type=shared, Persistent Filesystems, and Project-Level S3 Storage Usage

  A charge to the PI for using resources that cannot be accounted for on a per-job and/or per-user basis is recorded on a per-day basis. The record of these charges is only available through `acct_query` under the drc queue for the PI.

- ### AWS Project Account Charge

  In order to comply with NASA rules and regulations for working in the cloud, there are a number of underlying resources active in the project's AWS account. These cannot easily be included on a per-PBS-job or per-day basis, so they are added at the end of the month when the final AWS bill arrives. The charge normally amounts to ~$100/month and it is not reflected in the `acct_query` output.

- ### NAS Overhead

  In addition to the hardware and network resources, there is support infrastructure by AWS and HECC to be maintained. An overhead cost for this infrastructure is added to the charges for the above items.

Allocation Thresholds

Allocations are checked once a day at 12:05 a.m. (Pacific Time). When a project's allocation goes below a certain threshold, the GID and its users are disabled in the PBS Access Control List (ACL). Re-enabling happens automatically at 12:05 a.m. if the allocation goes above the threshold after the PI sends in additional funding. In the event the PI wants his/her account to be reactivated immediately, NAS staff with root privilege can also run a script at anytime to update the ACL.

Use the `acct_ytd` and `acct_query` tools on a PFE to check your allocation usage on AWS (`-caws`) or all supported HECC Cloud providers (`-ccloud-all`). For example,

```
pfe% acct_ytd -caws
pfe% acct_ytd -ccloud-all
pfe% acct_query -caws -u username -p your_gid -b 07/01/19
pfe% acct_query -ccloud-all -u all -p all -b 07/01/19
```

A sample output of the last command is shown here:

```
Printing information for all the users supplied.
REPORT FROM 07/01/19 TO 07/19/19

ACCT_QUERY: Generating data ...


GRAND TOTAL FOR 07/01/19 TO 07/19/19
CLIENT    USER       PROJECT    QUEUE       SBU Hrs/Cloud BU
-------   ---------- ---------  ----------- ----------------
aws       staff1     cstaff     cloud_exec    2.207
aws       staff1     cstaff     drc           6.000
aws       staff1     cstaff     frontend     73.781
aws       staff2     cstaff     cloud_exec    2.337
aws       staff2     cstaff     drc           0.000
aws       staff2     cstaff     frontend      5.821
TOTAL FOR    aws.cstaff                      90.146

TOTAL FOR ALL PROJECTS FOR CLIENT: aws     90.146

TOTAL FOR PROJECT ON ALL CLOUD: cstaff     90.146
```

Note: All numbers shown in the output of `acct_ytd` and `acct_query` for HECC AWS Cloud usage are in CBUs.

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https://www.nas.nasa.gov/hecc/support/kb/entry/596/